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Qualitative Composition and Seasonal Fluctuation of Oribatei (Acarina) in Burdwan Soil, West Bengal (India)

Somnath BANERJEE

Department of Zoology, Suri Vidyasagar College,
District-Birbhum (West Bengal), India

Introduction

Qualitative as well as quantitative ecology of mite fauna and their seasonal variations in undisturbed soils, agricultural grass land and wood land soils have been studied by workers like WEIS-FOGH (1948), MURPHY (1953), SHEALS (1957), HAARφV (1960), DHILLON & GIBSON (1962), DAVIS (1963), BLOCK (1966), LOOTS & RYKE (1967), WOOD (1967a, b), AOKI (1967) from different corners of the world. An attempt has been made here to investigate the qualitative composition of oribatid mite fauna and its pattern of fluctuation in two sampling plots of Burdwan University campus at Golapbag.

Habitat

Two plots, A & B each 5 m×5 m, were selected for sampling at Golapbag in Burdwan University campus. Both the area were uncultivated and undisturbed. Plot A was covered with a good number of herbs, shrubs and trees. Plot B was less vegetated. Soils of the plots were dark gray in colour, alluvial in nature and clay loam in texture.

Materials and Methods

The plots were sampled by a steel borer of conventional type from 0–5 cm depth and 10 cm^2 in sunface area, the cores were extracted in a high gradient extraction apparatus (MACFADYEN, 1961). Altogether 48 samples were collected from the two plots at fortnightly intervals over a period of 12 months (from January 1970 to December 1970). Organic carbon was determined by rapid titration method of WALKLEY & BLACK (1934).

Observation

Qualitative composition of oribatid fauna: The oribatid fauna extracted like *Scheloribates*, *Lamellobates bengalensis*, *Oppia yodai*, *Archegozetes magna*, *Tectocepheus velatus* and *Allonothrus monodactylus* were common in both the plots (Table 1). The individuals of the genus *Scheloribates* were predominant and were extracted from all of the samples of plots A and B. In degree of dominance the species *Lamellobates bengalensis*, *Archegozetes magna* and *Oppia yodai* occupied the 2nd, 3rd and 4th positions respectively. The number of the remaining species was very meagre with their occurrence highly irregular. The population density of Oribatei was higher in plot A than in plot B.

Table 1. Monthly population of oribatid mites encountered in two sampling plots of Burdwan University Campus (January, 1970 to December, 1970)

Plot	Species	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
A	*Scheloribates*	26	20	14	9	6	16	65	60	41	30	28	25
	Lamellobates bengalensis	15	10	8	5	2	11	50	44	30	25	20	18
	Oppia yodai	12	9	6	4	2	8	41	35	28	21	15	14
	Archegozetes magna	4	2	—	—	—	20	64	59	41	10	—	—
	Tectocepheus velatus	—	—	—	—	—	—	—	—	5	9	9	10
	Hoplophorella africana	2	1	—	—	—	—	—	—	3	—	—	1
	Allonothrus monodactylus	5	—	—	—	—	—	—	—	—	10	12	9
	Total	64	42	28	18	10	55	220	198	148	105	84	77
B	*Scheloribates*	12	10	9	7	4	9	31	26	19	15	11	10
	Lamellobates bengalensis	8	7	6	4	1	5	20	18	17	12	10	9
	Oppia yodai	6	5	6	5	2	3	15	12	11	9	8	7
	Archegozetes magna	1	3	—	—	—	12	28	25	19	8	—	—
	Tectocepheus velatus	—	—	—	—	—	—	—	3	2	—	1	—
	Epilohmannia pallida	1	1	—	—	—	—	—	—	—	2	2	—
	Allonothrus monodactylus	—	—	—	—	—	—	—	—	—	4	3	2
	Total	28	26	21	16	7	29	94	84	68	50	35	28

Seasonal fluctuation: The total number of oribatids obtained in these plots showed an irregular trend of fluctuation. It was maximum in July-August (monsoon months), minimum in May and more or less constant in November and December. It actually exhibited a steep increase from May until it attained its peak in July followed by gradual decline.

Discussion

Many previous workers like FORD (1935, 1937), STRENZKE (1951), HAARLφV (1960), BLOCK (1966) have shown that soil mites are usually most abundant in autumn and winter and least abundant in summer. But the results obtained in the present investigation are in marked contrast to those of the previous workers. The general form of the population has been determined by *Scheloribates, Lamellobates bengalensis, Archegozetes magna* and *Oppia yodai* which are to some extent significant in number and members of which reach their maxima in July-August. An absence of some forms in certain periods of sampling and an irregular trend of fluctuation was also observed by RIHA (1951) and SHEALS (1957) who have suggested that certain species of mites migrate from soil and litter on to herbage at certain times of the year for reproduction.

The soil factors undergo modification due to rainfall and temperature. Growth of vegetation exerts certain influence on the ecological make up of the sampling sites. LOOTS and RYKE (1967) have suggested that the Oribatei in general prefer soils with a high organic content. In this study it has been observed that the population density of Oribatei is higher in Plot A (Table 1) where organic carbon content of soil is also high (Table 2). Vegetation produces the basic food for the soil community (DRIFT, 1966). But how far they exert influence on the mite fauna is not definitely known. The plant roots may influence their surroundings both physically and chemically (WOOD, 1960) and also by providing organic matter from their dead tissue. For this, soil samples collected near the rhizosophere contained more mites than those

Table 2. Organic carbon content and bacterial population in the plots A and B.

	Dilution of Soil.	Average no. of colonies per plate		Organic carbon (%)
Plot A	10^{-5}	Bacteria Actinomycetes Fungus	40 15 7	2.79
Plot B	10^{-5}	Bacteria Actinomycetes Fungus	11 5 3	0.91

collected far from it. "On different occasions we saw a remarkable increase of the animal population density in soil samples taken from Rhizosophere" (RAPOPORT & IZARRA, 1966). It has been also interesting to note that the species *Archegozetes magna* which favours the rotten and fungus-infected fruits of *Polyalthia longifolia* is more abundant in Plot A. The plot is comparatively thickly vegetated, supported a rich fauna of oribatids and also higher bacterial population than in Plot B (Table 2).

The monsoon peak of abundance might be attributed to an ideal moisture condition. DRIFT (1963) believes that soil moisture, governed by precipitation, is the most important climatic factor involved in the disappearance of litter, for which the soil fauna is considered to be responsible. The minimum population in summer which is said to be due to prevalence of drought condition is in consonance with the observations of FORD (1937) and WEIS-FOGH (1948) and more European authors. The fluctuation pattern is also reported to depend on factors like availability of food and presence or absence of predators. A similar trend of fluctuation (i. e. without winter maxima) was also observed by HAMMER (1944), KÜHNELT (1955).

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Summary

The oribatid fauna obtained like *Scheloribates*, *Lamellobates bengalensis*, *Archegozetes magna* and *Oppia yodai* are numerically dominant. The total population of oribatid mites of both the plots exhibits an irregular trend of fluctuation which gives a maximum in July-August, a minimum in May and is more or less constant in November and December. Organic carbon content of the soil may increase the population density of oribatid mites.

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